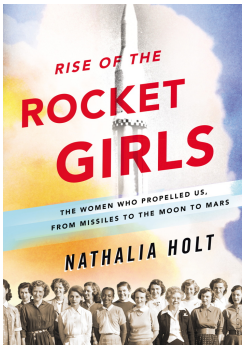
Rise of the Rocket Girls, *Natalia Holt*, Little, Brown and Company, (2016) ISBN 978-0316338929 (hbk), 352 p.



Natalia Holt

This book tells the story of the women hired as computers at Jet Propulsion Laboratory (JPL) in Pasadena, CA. This lab was specialized in designing the rockets, originally with the intention of weaponry using the knowledge of Wernher von Braun, inventor of the Nazi V-2, who is then working in a lab in Alabama. Later JPL participated in the space race as it became part of NASA in 1958. When digital computers were introduced, they initially were only a back-up for the women tapping away on their Friden calculators. However, as machines became more reliable, the women transformed into the programmers of the mainframe machines.

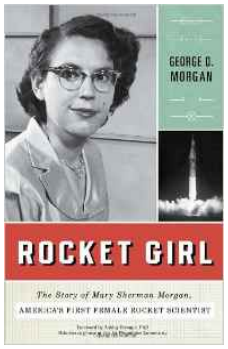
The book covers the period 1940's, 50's and 60's. The start of JPL, and the background of some of these female computers. Later in the book it becomes basically an enumeration, almost month after month, of test launches often turning into disasters and the women computing the amount of fuel required or the trajectories the rockets were supposed to follow. Because the USA were loosing the space race against the USSR, their work was always under pressure. The history is told from the viewpoint of the women working under male engineers, but they really did the bulk of the work while their name only scarcely appeared on the publications. Most of these women are white, but, being women they had to fight for gender equality. The book is also involved in many girlie aspects like engagements, marriage, pregnancy, child birth, nanny and babysitter problems, divorce, fashion, the introduction of the pill, the pantyhose, etc. In the background, yet with impact on their work, we hear the rumble of historic events like Pearl Harbor, the Cuba crisis, Sputnik, Laika, and Gagarin, the murders of J.F. Kennedy and Martin Luther King, and much more. The book ends with a group of retired women visiting the modern JPL premises.

JPL computers 1953. © NASA/JPL

One of the first women at JPL was Macie Roberts who was the supervisor of the group. But we are also introduced to Helen Ling, Barbary Paulson, Sue Finley, and many others that are on the picture above. Janez Lawson was special in the group since she was the only black woman and she had an engineering degree in chemistry. These women helped develop the multistage rockets, the casing of the rockets, the nose cones, gravitational slingshots, and many other challenges they had to overcome, maneuvering where none had gone before. They had to deal not only with the failing of the rockets, but also with the early unreliable digital computers, handling stacks of punched cards, punched paper tapes, etc. At later stages they were working in other projects such as launching planetary missions to Venus, Mars, and Mercury.

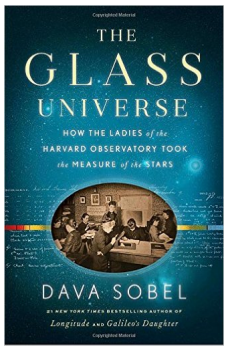
There seems to be an outburst of books devoted to women's emancipation and their important role in opening STEM (science, technology, engineering, and mathematics) careers for women. For a long time women worked under the supervision of male engineers, and although they were essential in analyzing the data, and they did the bulk of the work, they stayed in the background and their name was rarely mentioned on the cover of the reports and the publications, if at all on the inside. Many of them had a particular interest in mathematics or engineering and took courses in an almost exclusively male environment. They were engaged to do the computational work and do the data processing that, as more reliable digital computers were introduced, was taken over by machines. As these human computer units were gradually closed down, many of these women became computer programmers. These women did not have an engineering degree but they grew into their work and after a while they were as good in the engineering work as the male engineers. On the other hand, these books create the wrong impression as if this was a purely female business. Female employers usually got a lower salary than their male colleagues and so became a group often forming a bond or sisterhoods of 'we females' in the predominantly male companies.

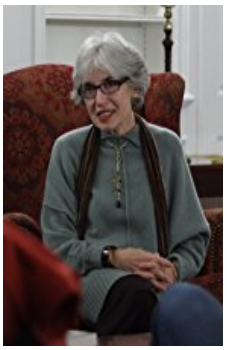
Here are some other books that I did not read, but that tell us about the same story as what is in *Hidden Figures* (for the black computers of Langley) and in *Rise of the Rocket Girls* (for the white computers of JPL in Pasadena).



G.D. Morgan

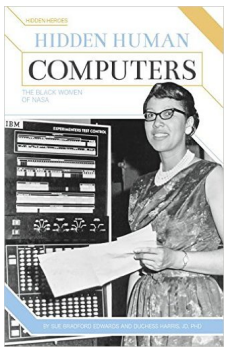
Rocket Girl: The Story of Mary Sherman Morgan, America's First Female Rocket Scientist *George D. Morgan*, Prometheus Books (2013)
As a chemist, not a computer, Mary Sherman worked for *North American Aviation* at Canoga Park, Los Angeles where she computed the performance of new rocket propellants. She designed a new one that fuelled the rockets tested in JPL. The success was the result of the minds of Wernher von Braun and Mary Sherman. While von Braun became an illustrious personality, Mary sank into oblivion. The author George Morgan is her son.





D. Sobel

The Glass Universe: How the Ladies of the Harvard Observatory Took the Measure of the Stars, *Dava Sobel*, Viking (2016).
Women were hired as human computers working on data collected by male astronomers, but gradually they studied the glass photographic plates on which stars were registered. They could analyze the material stars were made of and divide them in categories, detected novae, and designed a generally accepted classification system of stars.



S. Bradford Edwards

Hidden Human Computers: The Black Women of NASA (Hidden Heroes) *Sue Bradford Edwards*, Essential Library (2016)
It tells about the same story as *Hidden Figures* of the female computers who worked for NACA and NASA from 1940 till 1960, and who gradually became computer programmers as digital computers entered the field. Sue Bradford Edwards is the granddaughter of one of these computers, Miriam Daniel Mann.

Adhemar Bultheel